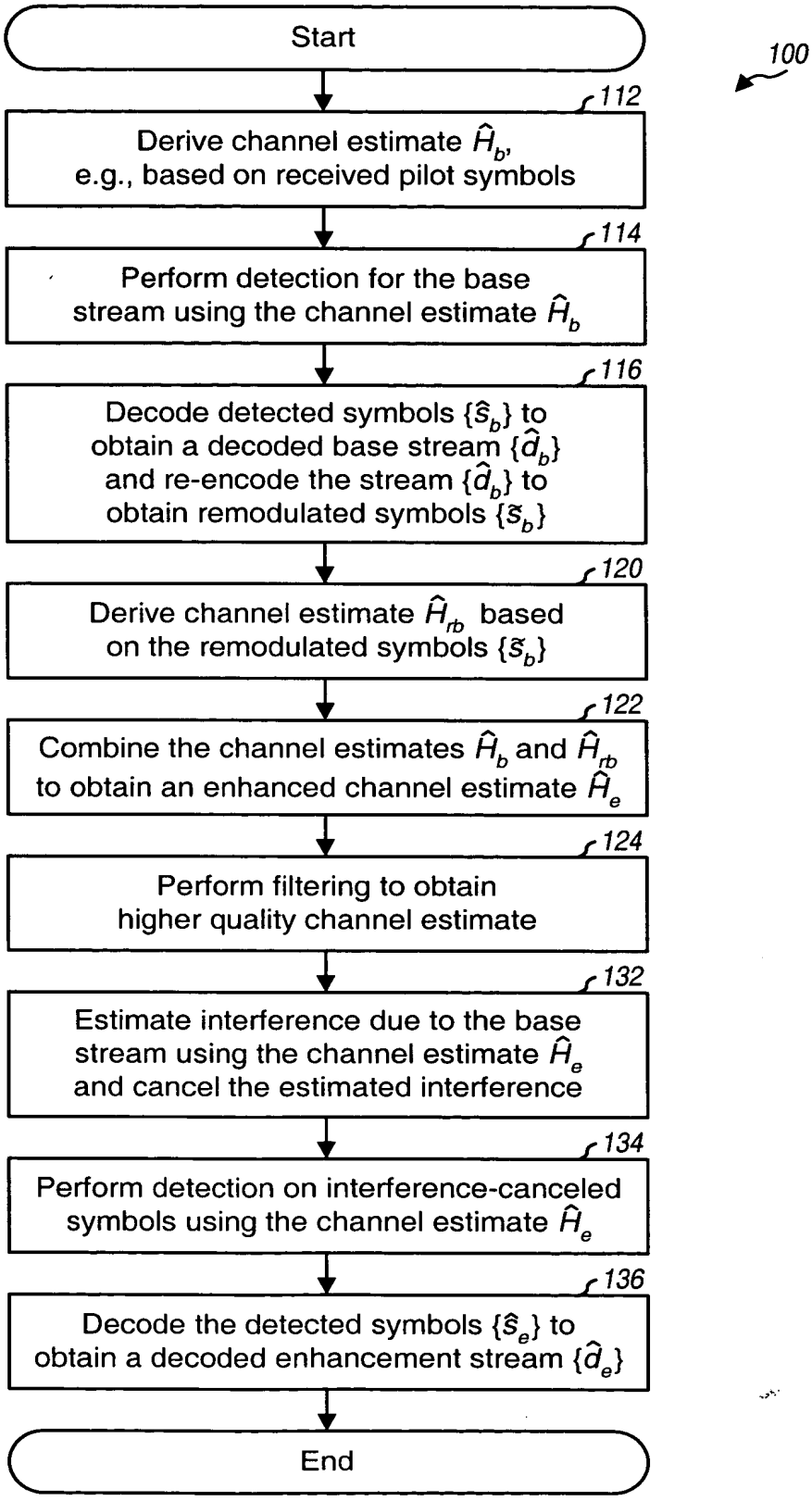
Start
100
112
Derive channel estimate $\hat{H}_b$, e.g., based on received pilot symbols
114
Perform detection for the base stream using the channel estimate $\hat{H}_b$
116
Decode detected symbols $\{\hat{s}_b\}$ to obtain a decoded base stream $\{\hat{d}_b\}$ and re-encode the stream $\{\hat{d}_b\}$ to obtain remodulated symbols $\{\tilde{s}_b\}$
120
Derive channel estimate $\hat{H}_{rb}$ based on the remodulated symbols $\{\tilde{s}_b\}$
122
Combine the channel estimates $\hat{H}_b$ and $\hat{H}_{rb}$ to obtain an enhanced channel estimate $\hat{H}_e$
124
Perform filtering to obtain higher quality channel estimate
132
Estimate interference due to the base stream using the channel estimate $\hat{H}_e$ and cancel the estimated interference
134
Perform detection on interference-canceled symbols using the channel estimate $\hat{H}_e$
136
Decode the detected symbols $\{\hat{s}_e\}$ to obtain a decoded enhancement stream $\{\hat{d}_e\}$
End

Figure 1

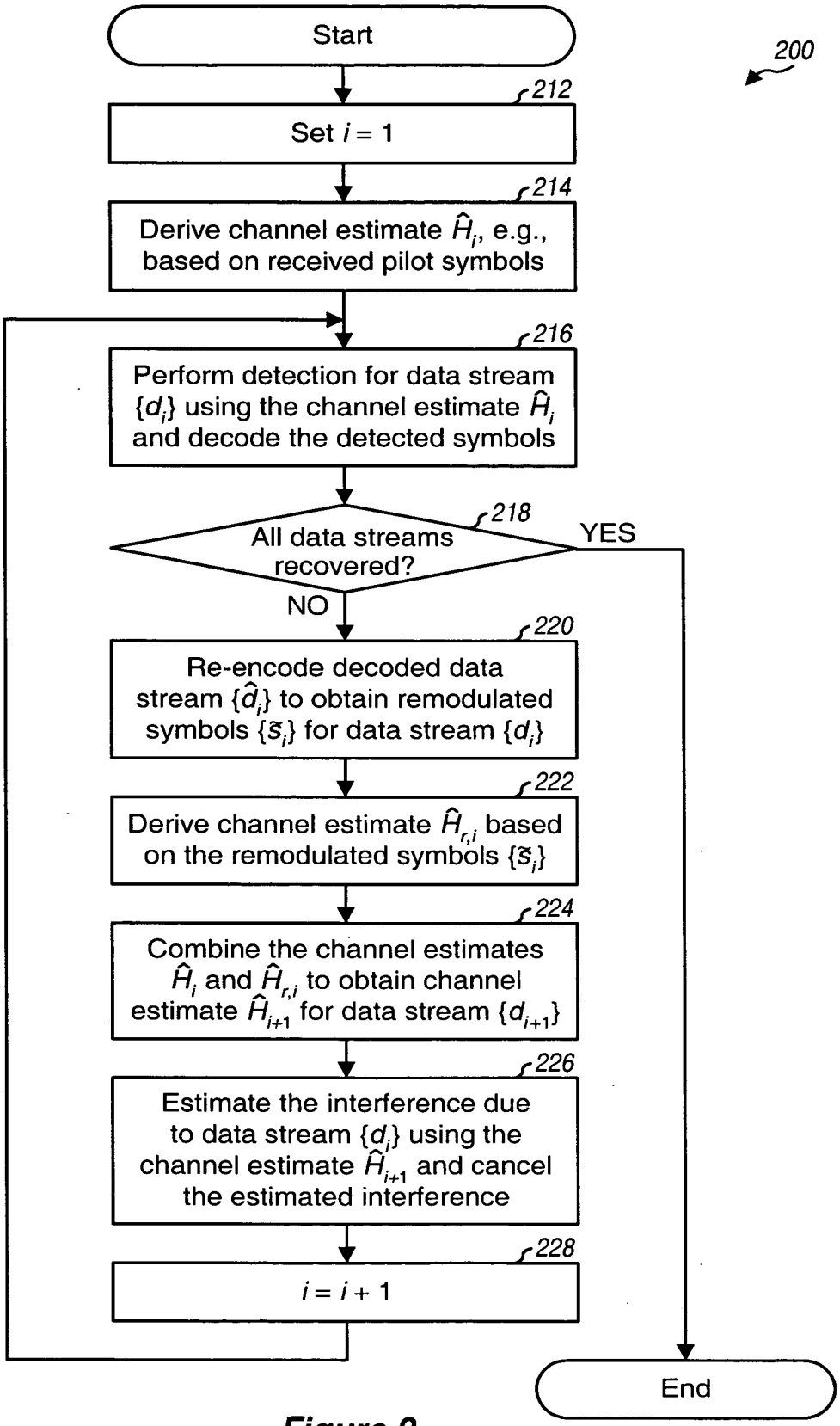
Start
200
212
Set $i = 1$
214
Derive channel estimate $\hat{H}_i$, e.g., based on received pilot symbols
216
Perform detection for data stream $\{d_i\}$ using the channel estimate $\hat{H}_i$ and decode the detected symbols
218
All data streams recovered?
YES
NO
220
Re-encode decoded data stream $\{\hat{d}_i\}$ to obtain remodulated symbols $\{\tilde{s}_i\}$ for data stream $\{d_i\}$
222
Derive channel estimate $\hat{H}_{r,i}$ based on the remodulated symbols $\{\tilde{s}_i\}$
224
Combine the channel estimates $\hat{H}_i$ and $\hat{H}_{r,i}$ to obtain channel estimate $\hat{H}_{i+1}$ for data stream $\{d_{i+1}\}$
226
Estimate the interference due to data stream $\{d_i\}$ using the channel estimate $\hat{H}_{i+1}$ and cancel the estimated interference
228
$i = i + 1$
End

Figure 2

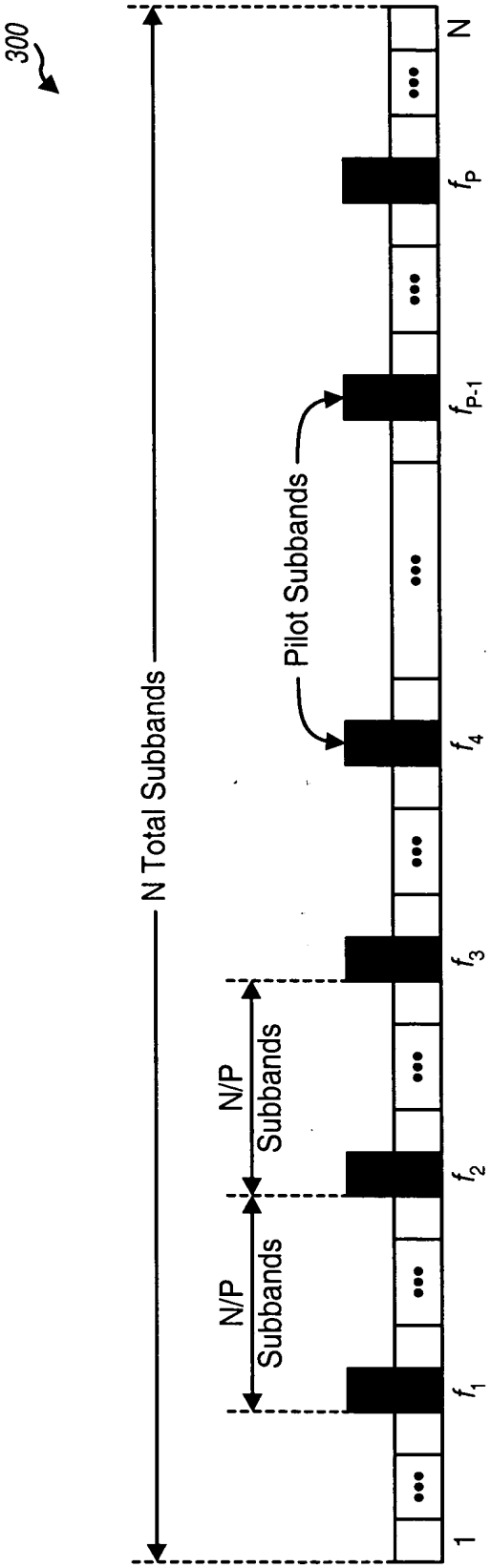
300
N
f_P
f_{P-1}
f_4
f_3
f_2
f_1
1
Pilot Subbands
N Total Subbands
N/P Subbands
N/P Subbands

Figure 3A

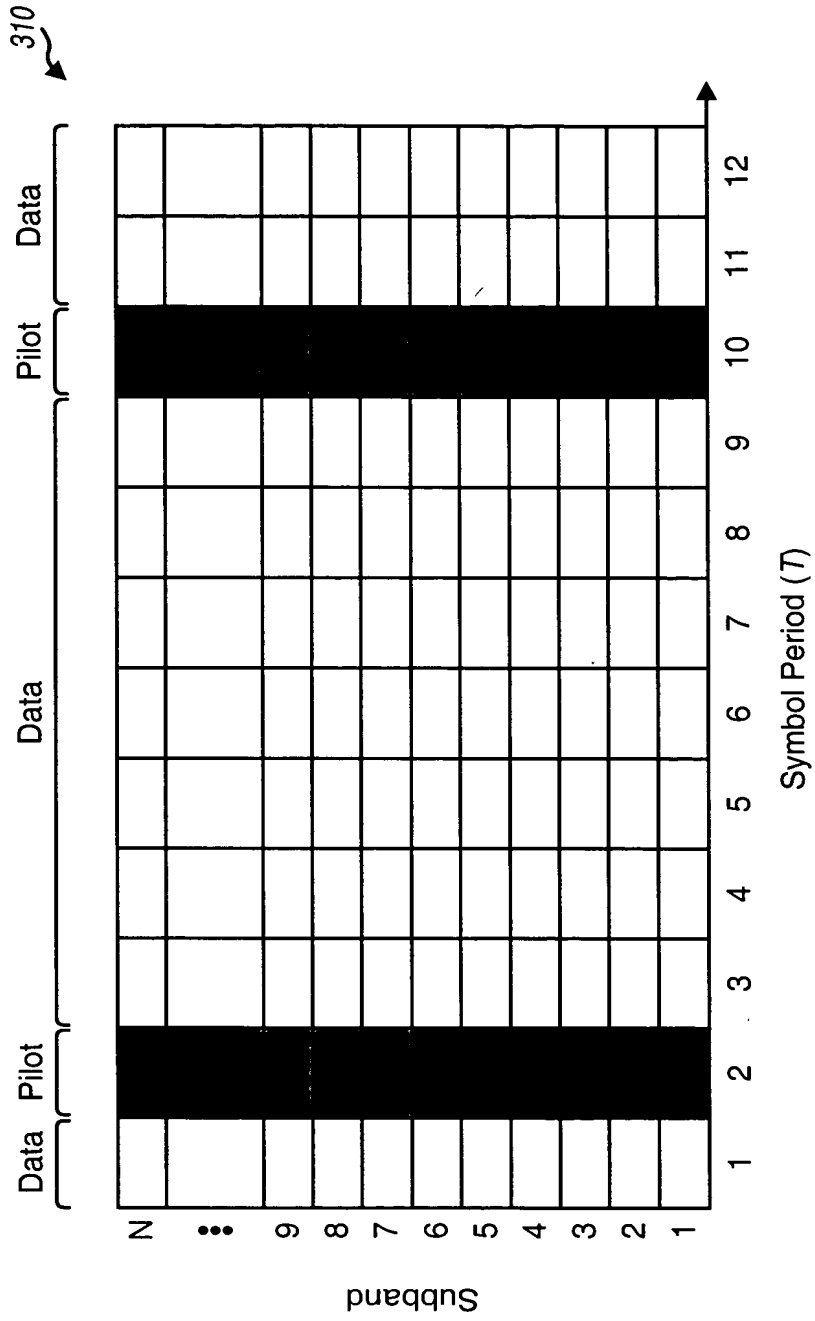
310
Data
Pilot
Data
Pilot
Data
Subband
N
9
8
7
6
5
4
3
2
1
1
2
3
4
5
6
7
8
9
10
11
12
Symbol Period (T)

Figure 3B

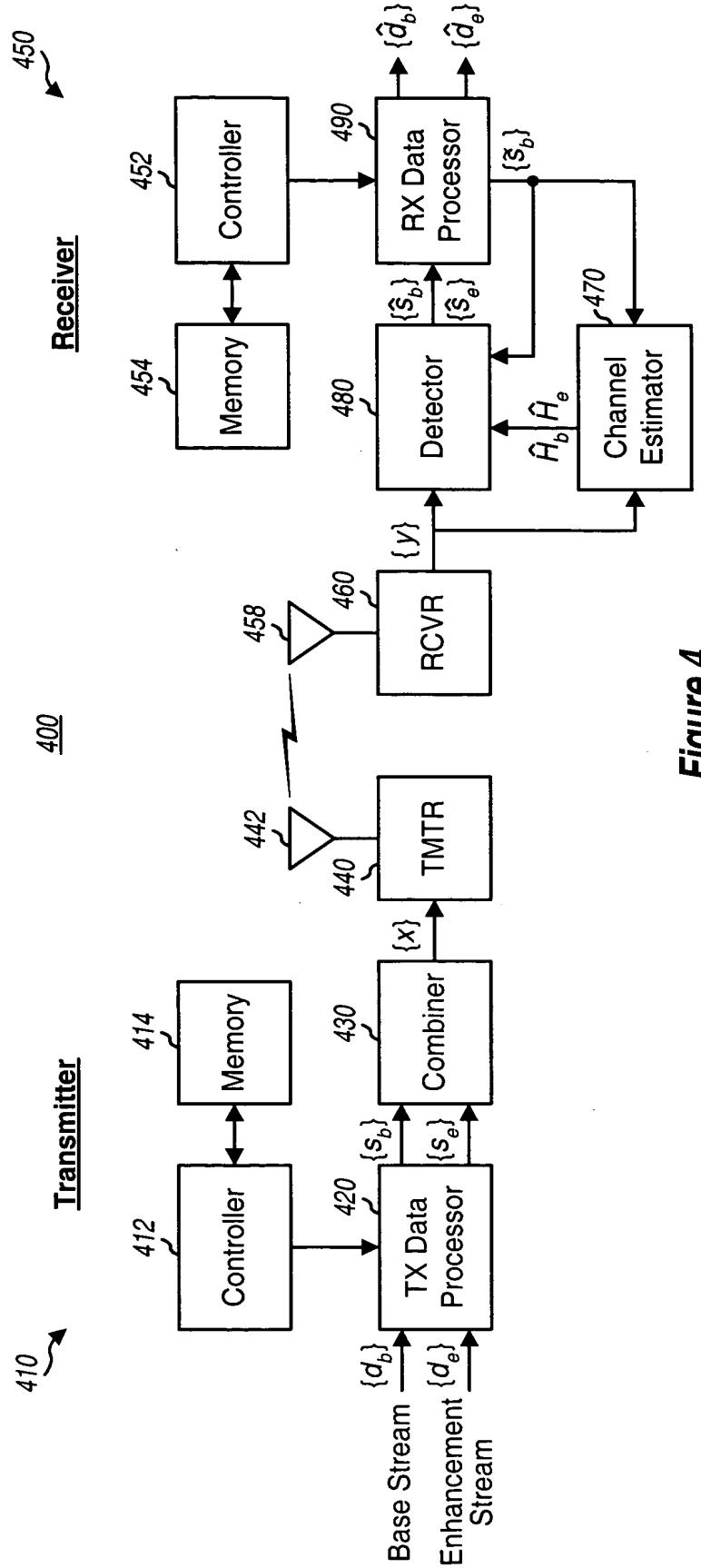
450
Receiver
452
Controller
490
RX Data Processor
$\{\hat{d}_b\}$
$\{\hat{d}_e\}$
$\{s_b\}$
454
Memory
$\{\hat{s}_b\}$
$\{\hat{s}_e\}$
470
480
Detector
$\hat{H}_b$ $\hat{H}_e$
Channel Estimator
$\{y\}$
458
460
RCVR
400
442
440
TMTR
$\{x\}$
414
Memory
430
Combiner
Transmitter
412
Controller
420
TX Data Processor
$\{s_b\}$
$\{s_e\}$
410
$\{d_b\}$
$\{d_e\}$
Base Stream
Enhancement Stream

Figure 4

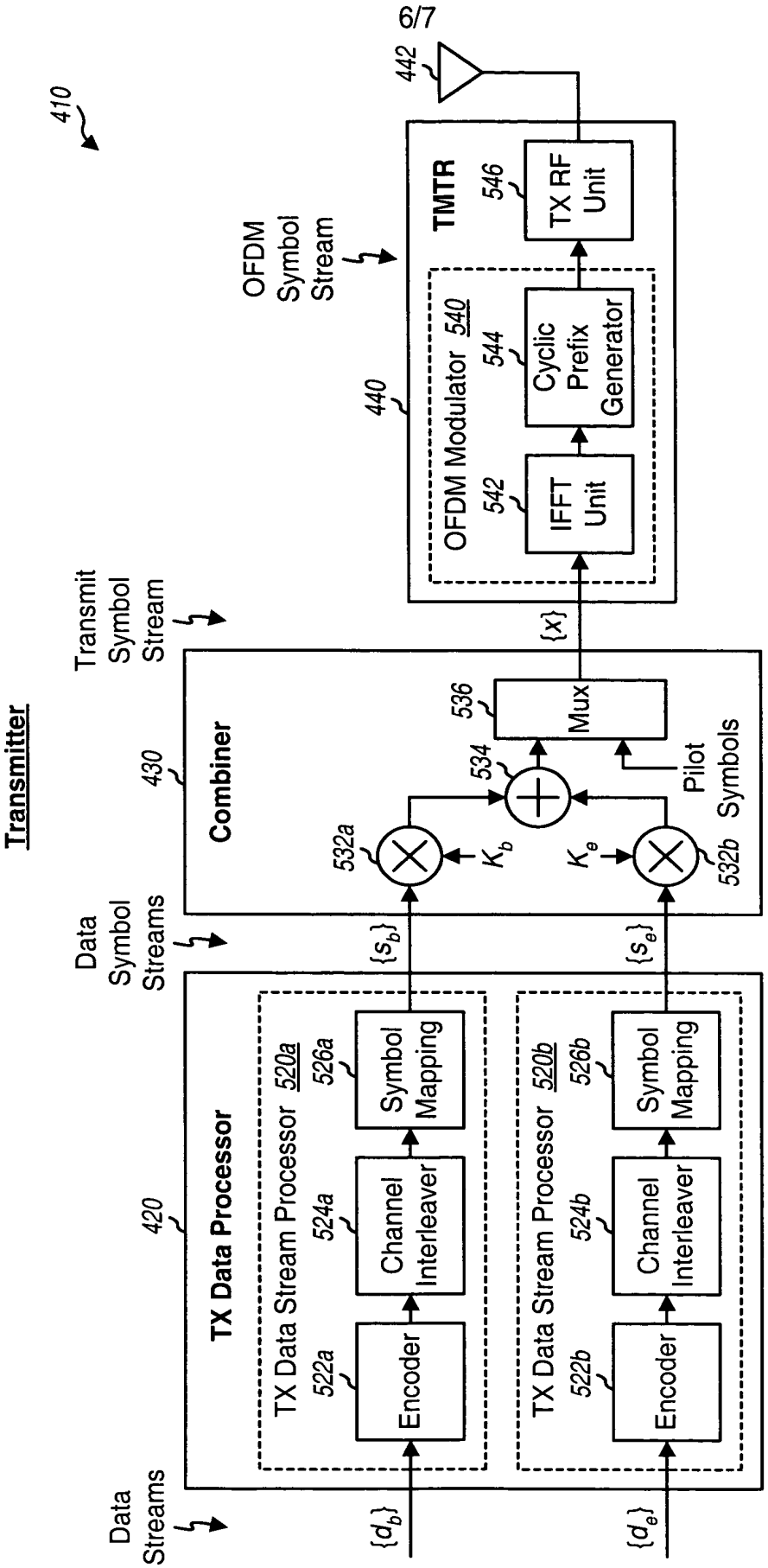
Transmitter
410
Data Streams
Data Symbol Streams
TX Data Processor
420
TX Data Stream Processor 520a
Encoder 522a
Channel Interleaver 524a
Symbol Mapping 526a
TX Data Stream Processor 520b
Encoder 522b
Channel Interleaver 524b
Symbol Mapping 526b
{d_b}
{d_e}
{s_b}
{s_e}
Combiner
430
532a
532b
K_b
K_e
534
536
Mux
Pilot Symbols
Transmit Symbol Stream
{x}
OFDM Symbol Stream
TMTR
440
OFDM Modulator 540
IFFT Unit 542
Cyclic Prefix Generator 544
TX RF Unit 546
442

Figure 5

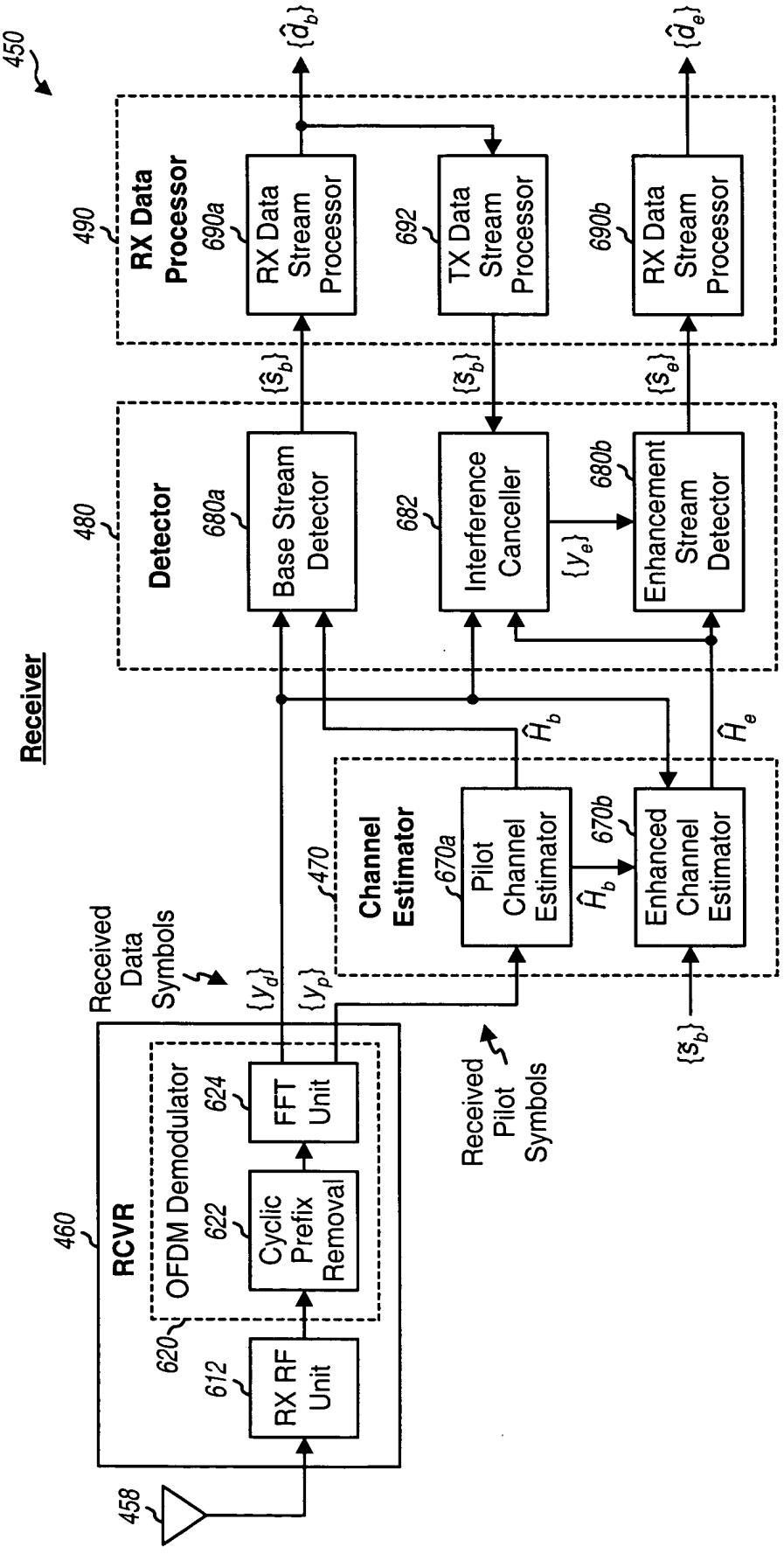
450
Receiver
490
RX Data Processor
690a
RX Data Stream Processor
692
TX Data Stream Processor
690b
RX Data Stream Processor
480
Detector
680a
Base Stream Detector
682
Interference Canceller
680b
Enhancement Stream Detector
470
Channel Estimator
670a
Pilot Channel Estimator
670b
Enhanced Channel Estimator
460
RCVR
620
OFDM Demodulator
612
RX RF Unit
622
Cyclic Prefix Removal
624
FFT Unit
458
Received Data Symbols
Received Pilot Symbols

Figure 6